

R E M A R K S

Reconsideration of this application is respectfully requested.

Amendment of Inventorship

The Examiner's confirmation that the inventorship of the present application has been amended is respectfully acknowledged. The Examiner is respectfully requested to confirm that the application has been forwarded to the Office of Initial Patent Examination so that the PTO's records can be corrected.

The Prior Art Rejection

Claims 10 and 15 were rejected under 35 USC 102 as being anticipated by USP 3,901,098 ("Jenkins"); claims 11-13 and 16-18 were rejected under 35 USC 103 as being obvious in view of the combination of Jenkins and USP 3,838,588 ("Johnson"); and claims 14 and 19 were rejected under 35 USC 103 as being obvious in view of the combination of Jenkins and USP 6,709,161 ("Yakura et al"). These rejections, however, are respectfully traversed.

Jenkins and Independent Claim 10

The present invention as recited in claim 10 includes a novel adjusting device for setting the axial position of the drive spindle (and the pinion carried by the drive spindle) relative to the bevel gear (mounted on the output shaft). With

the structure of the present invention as recited in claim 10, the prior art shims method described in the background section of the specification need not be used.

By contrast, Jenkins uses the commonly used, and time-consuming, shims method to obtain accurate engagement between the bevel gears 8 and 14. See column 2, lines 56-58 of Jenkins, which discloses that "there [are] shims 12 to enable accurate axial adjustment to eliminate backlash in the bevel gears 8 and 14." If Jenkins did disclose the adjusting device recited in claim 10, it would make no sense for Jenkins to rely on the time-consuming, trial and error, shims method.

And it is respectfully submitted that Jenkins does not, in fact, disclose or suggest the adjusting device of claim 10. Claim 10 recites "an adjusting device which sets an axial position of said drive spindle and said pinion relative to the bevel gear; . . . wherein said adjusting device comprises: a threaded portion on said drive spindle; an internal thread formed integrally with said inner ring [of the ball bearing] and arranged to cooperate with said threaded portion on said drive spindle; and a coupling device arranged to rotationally lock said inner ring relative to said drive spindle as a desired axial position of said drive spindle is obtained."

Indeed, it is respectfully submitted that Jenkins discloses using threads to secure together two parts of a drive shaft, and

does not disclose an adjusting device as recited in claim 10. In addition, it is respectfully pointed out that Jenkins does not disclose or suggest an adjusting device including an internal thread formed integrally with the inner ring of the ball bearing that axially supports the drive spindle relative to the housing, and a coupling device arranged to rotationally lock the inner ring relative to the drive spindle as a desired axial position of the drive spindle is obtained.

Jenkins discloses "a drive adapter 6 to which the shaft portion 7 of a spiral bevel gear 8 . . . is secured as by screw threads." (Column 2, lines 45-48.) The shaft portion 7 is thus secured to the drive adapter 6 by the screw threads. The shaft portion 7 is not adjustable with respect to the drive adapter 6 by the threads. In Jenkins, using the screw threads, a shoulder 19 of the drive adapter 6 is abutted against the facing shoulder of the shaft portion 7 (see the figure of Jenkins), thereby obtaining a secure and rigid connection between the drive adapter 6 and the shaft portion 7. Indeed, Jenkins refers to elements 6 and 7 as a drive shaft formed by the two parts. (Column 3, lines 53-54.) See also the references to the "drive shaft 6-7" or "shaft assembly 6-7" throughout Jenkins (column 2, line 51, column 3, lines 7, 20, and 30 and column 4, lines 1 and 11).

In Jenkins, the axial adjustment of the drive shaft 6-7 is performed using shims 12, not an adjustment device that includes

an internal thread formed integrally with the inner ring of the ball bearing that axially supports the drive spindle relative to the housing as recited in claim 10.

Jenkins discloses a ball bearing 10. However, according to Jenkins, "the inner race of the ball bearing 10 [is] a slide fit on the drive adapter [6]." In addition, according to Jenkins, when assembling the angle drive unit 1, "[t]he ball bearing 10 is . . . slip-fitted on the drive adapter 6 with the shaft assembly 6-7 pulled back to engage the shoulder 15 with the inner race of ball bearing 10 and appropriate shims 12 may be installed to precisely position the pitch cone vertex of the bevel gear 8 to coincide with the pitch cone vertex of the mating bevel gear 14 on the tool drive spindle 21" (column 3, lines 18-25, emphasis added). Thus, Jenkins does not disclose an adjustment device that includes an internal thread formed integrally with the inner ring of the ball bearing that axially supports the drive spindle relative to the housing as recited in claim 10. In fact, Jenkins discloses slip-fitting the inner race of a ball bearing 10 onto the drive shaft 6-7, and adjusting the axial position of the drive shaft 6-7 using shims 12.

It is respectfully submitted, moreover, that Jenkins does not disclose a coupling device arranged to rotationally lock the inner ring relative to the drive spindle as a desired axial position of said drive spindle is obtained as recited in claim 10.

As explained above, in Jinkins screw threads are used to secure the drive adapter 6 and the drive shaft 7 to form drive shaft 6-7. To use the threads for adjusting, by contrast, the thread connection would need to be loosened to act as an adjusting mechanism. And even so, there would be no control whatsoever of the axial position of the shaft 7 in relation to the drive adapter 6, because there is no locking device provided to determine a specific desired axial position. By contrast, according to claim 10 the adjusting device comprises "a coupling device arranged to rotationally lock said inner ring relative to said drive spindle as a desired axial position of said drive spindle is obtained" (emphasis added).

The Examiner has pointed to element 18 of Jinkins as being a coupling device. However, element 18 is a "spacer 18 of light-weight, low friction material" (column 3, lines 1-2) and is not arranged to rotationally lock the drive adapter 6 relative to the shaft portion 7. It is respectfully submitted that Jinkins does not disclose a coupling device as recited in claim 10, to rotationally lock the inner ring of the ball bearing relative to the drive spindle as a desired axial position of the drive spindle is obtained.

In fact, in Jinkins the adapter 6 and shaft portion 7 are secured together with their respective shoulders abutting, and as Jinkins explicitly states, the axial adjustment of the shaft portion 7 is accomplished by shims 12 inserted between the ball

bearing and the housing. (Column 2, lines 56-58, and column 3, lines 22-25.) It is respectfully submitted that the mere fact that thread locking means are described does not mean that the threads in Jenkins can function as the adjusting device of the present invention as recited in claim 10.

It is respectfully submitted that Jenkins does not even suggest an adjustment device (for pinion adjustment) using threads in the manner recited in claim 10. First, Jenkins has already provided a well established means of adjustment: shims. In addition, a thread connection between the shaft portion 7 and the drive adapter 6 is purely a securing mechanism and does not imply any adjustability.

In view of the foregoing, it is respectfully submitted that Jenkins clearly does not disclose or suggest the feature of the adjusting device as recited in claim 10 which sets an axial position of the drive spindle and the pinion relative to the bevel gear, wherein the adjusting device comprises: a threaded portion on the drive spindle, an internal thread formed integrally with the inner ring and arranged to cooperate with the threaded portion on the drive spindle, and a coupling device arranged to rotationally lock the inner ring relative to the drive spindle as a desired axial position of the drive spindle is obtained.

Accordingly, it is respectfully submitted that Jenkins clearly does not disclose or suggest the structure recited in independent claim 10.

Newly Cited Johnson

Johnson has been cited with respect to dependent claims 11-13 and 16-18. Johnson discloses a particular type of gearing for a rivet setting apparatus. The apparatus of Johnson does not include any angle gearing and does not have an adjustable pinion. Johnson discloses a gearing that can shift between two modes of operation. According to Johnson, when an operator presses the tool in the direction of work, the spindle 30 moves longitudinally so that splines engage at 37-38 and 39-40. Compare Fig. 4 with Fig. 2 and see column 2, line 58, to column 3, line 8. As a result of the engagement at splines 37-38, the spindle 30 is stationary. As a result of the engagement at splines 39-40, the nut 41 rotates along with sleeve 27, which causes the nut 41 to move upward due to threads 42 and 43, which causes the tool 17 at the bottom of Figs. 2 and 4 to retract upward. See column 3, lines 8-25.

It is respectfully submitted that Johnson does not relate to an adjusting device which sets an axial position of a drive spindle and pinion with respect to a bevel gear. The device described by Johnson relates to a totally different type of equipment and has quite different operational features both from the claimed present invention and from Jinkins. And it is respectfully submitted that one of ordinary skill in the art would not have any reason to modify Jinkins in view of Johnson to provide an adjusting device as recited in claim 10.

In addition, one of ordinary skill in the art would not have any reason to modify Jenkins in view of Johnson to provide a coupling device arranged to rotationally lock the inner ring relative (of the ball bearing that axially supports the drive spindle relative to the housing) to the drive spindle as a desired axial position of the drive spindle is obtained, in an adjusting device which sets an axial position of a drive spindle and pinion with respect to a bevel gear, as according to the present invention as recited in claim 10.

Still further, one of ordinary skill in the art would not have any reason to modify Jenkins in view of Johnson to provide a coupling device having the structure recited in claim 11, which recites that the coupling device comprises "a number of axially directed coupling teeth on said inner ring; and an annular coupling element provided with axially directed engagement teeth for cooperation with said coupling teeth; said coupling element having radially inwardly directed teeth for cooperation with splines on said drive spindle."

The Examiner has identified column 4, lines 6-22, of Jenkins as providing a reason to modify Jenkins in view of Johnson. This portion of Jenkins discusses various points, including that the axially movable spacer 18 (which is a coupling device as recited claim 10, according to the Examiner's interpretation "is useful in pressing the drawn cup needle bearing 17 into proper position in the bore 16." However, there is no suggestion in this portion

of Jenkins that it would be desirable to secure the spacer 18 "into a desired orientation with respect to the spindle."

It is respectfully pointed out, moreover, that even if one of ordinary skill in the art were motivated to provide radially inward teeth on the spacer 18 in Jenkins, the coupling device recited in claim 10 and the further structure recited in claim 11 still would not be achieved or rendered obvious.

As explained above with respect to Jenkins, according to claim 10 the adjusting device comprises "a coupling device arranged to rotationally lock said inner ring relative to said drive spindle as a desired axial position of said drive spindle is obtained" (emphasis added). By contrast, the spacer 18 of Jenkins is a "spacer 18 of light-weight, low friction material" (column 3, lines 1-2) and is not arranged to rotationally lock an inner ring of a ball bearing relative to a drive spindle. Even if radially inward teeth were provided on the spacer 18, it still would not be "arranged to rotationally lock said inner ring relative to said drive spindle as a desired axial position of said drive spindle is obtained" in the manner of the coupling device in claim 10.

In addition, according to claim 11, the coupling device comprises "a number of axially directed coupling teeth on said inner ring" of the ball bearing that axially supports the drive spindle relative to the housing. Radially inward directed teeth in the spacer 18 in Jenkins would not at all correspond to

axially directed teeth on the inner ring of the ball bearing that axially supports the drive spindle relative to the housing as recited in claim 11. Moreover, claim 11 recites that the coupling device comprises an annular coupling element provided with both axially directed engagement teeth for cooperation with the coupling teeth on the inner ring of the ball bearing, and radially inwardly directed teeth provided on the coupling element for cooperation with splines on the drive spindle. The Examiner has not pointed to any structure that would correspond to this coupling element of the coupling device recited in claim 11.

Yakura et al

Yakura et al has been cited with respect to claims 14 and 19. Nevertheless, it is respectfully submitted that Yakura et al, even viewed together with Jenkins or Johnson, does not disclose an adjusting device as recited in claim 10.

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In view of the foregoing, it is respectfully submitted that the present invention as recited in independent claim 10 and all of the claims depending therefrom clearly patentably distinguishes over Jenkins, Johnson, and Yakura et al, under 35 USC 102 as well as under 35 USC 103. Accordingly, allowance of the claims and the passing of this application to issue are respectfully solicited.

If the Examiner has any comments, questions, objections or recommendations, the Examiner is invited to telephone the undersigned at the telephone number given below for prompt action.

Respectfully submitted,

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